

Case 3676***Tupinambis indicus* Daudin, 1802 (currently *Varanus indicus*; Reptilia, Squamata): proposed conservation of usage of the specific name by replacement of the neotype**

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Abstract. The purpose of this application, under Article 75.6 of the Code, is to designate a new neotype for the mangrove monitor *Varanus indicus* (Daudin, 1802), which is endemic to the Moluccan islands of Indonesia. The recent choice of an unrepresentative specimen to serve as neotype for this nominal species has resulted in a shift of the specific name to a different species of *Varanus*, *V. chlorostigma* (Gray, 1831) from New Guinea and surrounding islands, and the recognition of an unnecessary taxon, *V. cerambonensis* Philipp, Bohme & Zeigler, 1999, on Ambon, Seram and Buru in the Moluccas. To conserve the name *indicus* in its original usage and to avoid further taxonomic confusion, it is proposed that the current neotype specimen be replaced by a new one that belongs to the original taxonomic species involved, thereby reducing *V. cerambonensis* to a junior subjective synonym of *V. indicus* and also conserving *V. chlorostigma* in its accustomed use as the valid name for the New Guinean species.

Keywords. Nomenclature; taxonomy; VARANIDAE; *Varanus chlorostigma*; neotype; southwestern Pacific; Moluccas; Ambon; Ravak; New Guinea.

1. *Tupinambis indicus* (currently *Varanus indicus*) was described by Daudin (1802, p. 46), who considered it to be synonymous with or similar to the ‘*Senembi*’ in Jacob de Bondt’s classic work on the natural history of the East Indies (Bontius in Piso, 1658). This presumed synonymy appears to stem from a misinterpretation by Daudin; no *Senembi* is included in de Bondt’s original publication. However, in a 1658 reprint of de Bondt that includes the work of Willem Piso, there is a figure, most likely depicting a *Tupinambis*, in the chapters written by Piso on the fauna of Brazil, and this figure precisely corresponds to Daudin’s reference and description (‘*Senembi*, Iguana 2 figurata’, see Piso, 1658, p. 104).

2. Daudin (1802, vol. 3, p. 47) stated that *V. indicus* was discovered on Ambon in 1792 by Claude Riche, one of the naturalists of the d’Entrecasteaux Expedition. This statement has led some workers to assume that the specimen examined and illustrated in Daudin (1802, p. 46) was actually collected by Riche (e.g. Sprackland, 2004, p. 3). When the d’Entrecasteaux Expedition disbanded as a result of the French revolution after having reached Java in 1793–1794, the natural history collections were confiscated by the Dutch and sent to England. Labillardière (the expedition’s chief botanist) managed to have his collections returned to him a few years later and the plant material is now deposited in the Florence Museum of Natural History, Italy

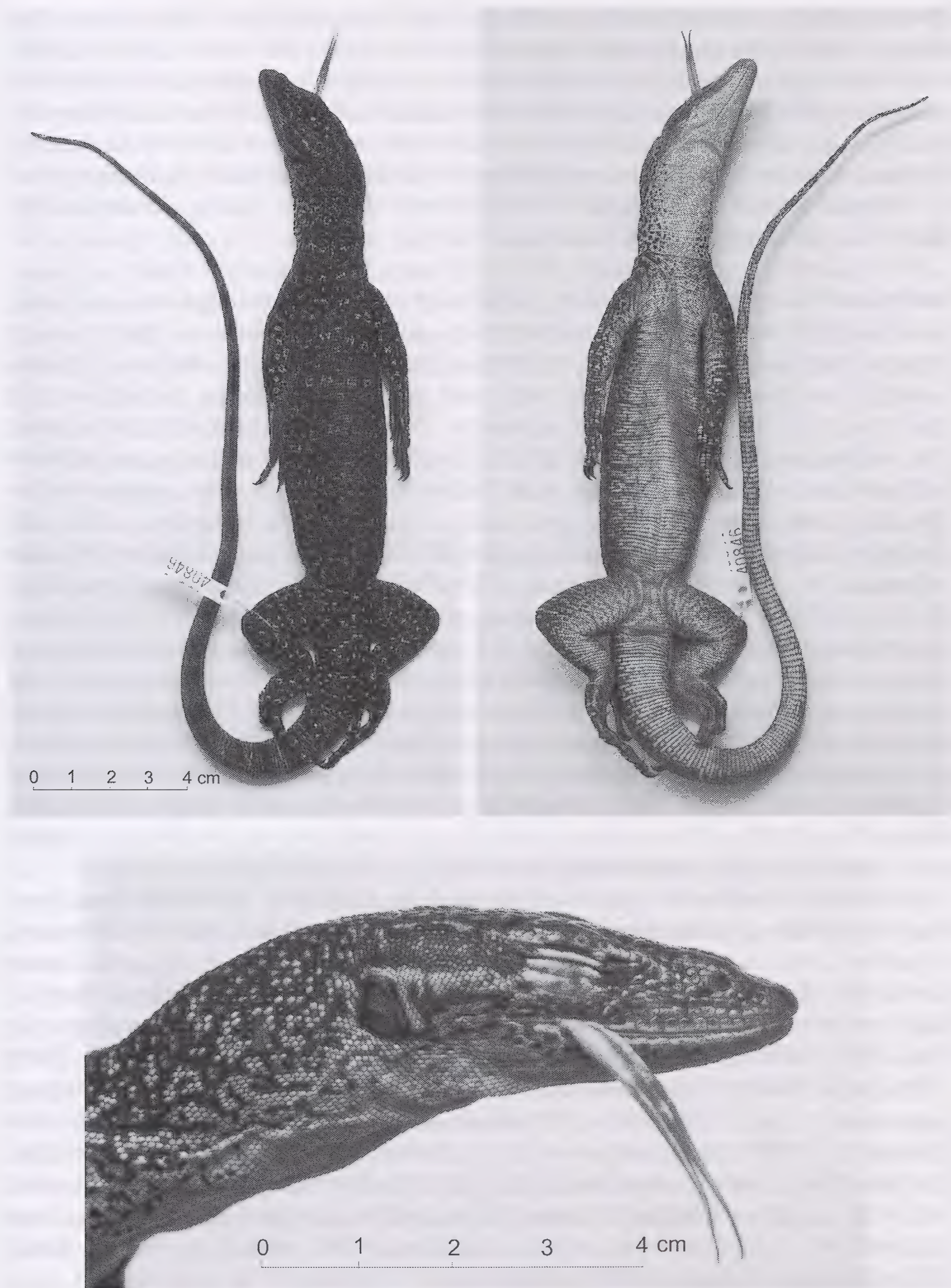


Fig. 1. Full body dorsal, ventral and lateral view of the proposed neotype of *Varanus indicus* (Daudin, 1802), specimen RMNH 40846.

(Frodin, 2007, p. 18). The fate of Riche's collection is more obscure and the whereabouts of his specimens are unknown today. No part of it was ever registered at the National Museum of Natural History, Paris (MNHN) and no specimens of

Varanus collected on Ambon exist at the British Museum (I. Ineich pers. comm. May 2014; C. McCarthy pers. comm. April 2009; Boulenger 1885, vol. 2, p. 317) and therefore it appears unlikely that the specimen examined by Daudin could have been one collected by Riche. It is probable that Daudin and Riche never met, as Riche died in 1797 when Daudin was still early in his career. Only later did Daudin become intimately familiar with Riche's work, after he had been given access to his field notes by Georges Cuvier and Claude Riche's sister-in-law, Mrs Prosny. Unfortunately these notes now appear to be lost (Bour, 2011).

3. It is evident that Daudin described some of his species, such as *Cuora amboinensis* Daudin, 1802 (vol. 2, p. 309), based only on the detailed notes of Riche. Daudin (1802) made clear in his description of *V. indicus*, however, that he had a physical specimen available in his collection that he considered similar to Riche's animal from Ambon and which was used for the diagnostic description and accompanying illustration (which appears to depict a stuffed animal). Considering that nothing else is mentioned by Daudin and that very few collecting expeditions had been made further to the east from Ambon prior to 1802, there seems to be no reason to question Ambon as the type locality. Although it has been assumed that the specimen studied by Daudin was lodged at MNHN and subsequently lost from the collection (Brygoo, 1987; Böhme et al., 1994; Philipp, et al., 1999; Sprackland, 2004; De Lisle, 2009), a corresponding specimen was never catalogued at the MNHN and has probably never been lodged there (I. Ineich, pers. comm. Jan. 2014). Instead, it was most likely part of Daudin's large private collection, which was split up and sold at auction in January 1804, shortly after his death (Bour, 2011). The museum in Paris acquired a large selection of ethanol-preserved lizards from that auction, but there are no records of stuffed specimens being bought. Very few specimens that were sold to private collectors on that occasion have ever been recovered (R. Bour, pers. comm., Jan 2014), and it is unlikely that the specimen used in Daudin's description of *V. indicus* will be located in the future.

4. Studying vouchered material from Ambon, Philipp et al. (1999) found two morphologically different forms of *Varanus* and concluded that one must represent *V. indicus*, and the other an undescribed taxon. Two juvenile specimens at the former Zoological Museum Amsterdam (ZMA 11146c & ZMA 11146d) differed from all other specimens from the type locality. From Daudin's (1802) very general description of *V. indicus*, Philipp et al. concluded that ZFMK 70650 (originally ZMA 11146d) and ZMA 11146c, with an evenly spotted dorsum, dark tongue and without a postocular stripe, represented *V. indicus*, and they designated one of the two specimens, ZFMK 70650, as the neotype for that species (Philipp et al., 1999, p. 276). The other form, with spots arranged in faint transverse bands, a bi-coloured tongue and with a yellow postocular stripe, being well-represented in collections from Ambon, was regarded as an undescribed species and named *V. cerambonensis* Philipp, Bohme & Zeigler, 1999 (p. 281).

5. The present author's observations in the field in 2009 on the islands of Ambon, Seram, Saparua and Buru in the Moluccas failed to detect animals consistent with Philipp et al.'s (1999) neotype-based diagnosis of *V. indicus*. This led to an investigation of the origins of the neotype specimen. It turned out that ZMA 11146 was the catalogue number of a shared jar containing four juvenile specimens with no individual tags, numbers or associated collection information (the individual

a, b, c, d labels were assigned long after the jar had been catalogued, by T. Brandenburg in 1983). Two of the specimens (a & b) correspond in morphology with other known material from Ambon, while the other two (the above-mentioned c and d) correspond best with material from New Guinea and its offshore islands. Except for the number 'ZMA 11146' and the note 'Ambon', there was one additional label in the container, 'KM 2979-9'. Sonja Wijs (*Tropenmuseum, Amsterdam*) traced this KM number to the catalogue of the former Koloniaal Museum Haarlem in Amsterdam; a 'Zoological Collection' had been donated to the latter museum (KM) on 14 March 1913 by military pharmacist W.L.A. Warnier following the death of the collection's owner, notary Willemsz Geerrooms, who had been stationed in Ambon. The catalogue entry does not indicate whether or not the specimens had actually been collected on Ambon, only that the collector lived there. It is fully possible that parts of the collection had been assembled from other provinces or received in exchange from collectors in other regions.

6. The neotype specimen selected by Philipp et al. (1999) agrees in scalation and colour pattern with populations of *Varanus* from the northern and western parts of New Guinea. Animals from this region, in contrast to those from Ambon, generally have lower midbody and dorsal scale counts, they lack a yellow postocular stripe, the dorsum has evenly dispersed yellow dots rather than dots arranged in transverse bands, and their tongue is uniformly dark instead of bi-coloured. A multivariate analysis of scalation characters groups the neotype together with specimens of *Monitor chlorostigma* Gray, 1831 (currently *Varanus chlorostigma*) from the island of Waigeo (Weijola & Sweet, 2015). Although Waigeo is a possible locality of collection of the neotype it is impossible to pinpoint the precise geographic origin based on morphology alone. The neotype could have been packed together with material from Ambon by mistake or as a means to save storage space at a time when the value of locality data was less appreciated. The collection archive of the Koloniaal Museum was lost during re-organisations in the 1960s when the zoology collections were transferred to ZMA, making further insight into the provenance of the neotype impossible (S. Wijs, pers. comm. February 2014). Nonetheless, as detailed here it seems unrealistic that this specimen was collected on Ambon.

7. All other voucher specimens known from the central Moluccas held at the Naturalis museum in Leiden, The Netherlands (11 from Buru (RMNH 7223, ZMA 15416a-j), one from Haruku (RMNH 7197), one from Seram (RMNH 3189) and 12 from Ambon (RMNH 7297a-h, RMNH 7196, RMNH 3152, RMNH 3150, ZMA 11146a) examined by the present author in September 2010, the only specimen collected at Ambon in the collections of the Museum für Naturkunde der Humboldt Universität Berlin, Germany (ZMB 4848) (examined by Philipp et al. 1999) and one specimen from Buru at the Senckenberg Museum, Frankfurt-am-Main, Germany (SMF 56469) (reviewed by Weijola & Sweet, in press) correspond to the diagnosis given by Philipp et al. (1999) for *V. cerambonensis*. The three specimens held at the Zoologisches Forschungsmuseum Alexander Koenig, Bonn, Germany (ZFMK 70617-70619) from Seram, and one from Ambon (ZMA 11146b), also correspond to this diagnosis (Phillip et al., p. 280).

8. Philipp et al. (1999, p. 285) hypothesized that the two nominal species they recognized from Ambon are ecologically different, with *V. indicus* occupying coastal habitats, and *V. cerambonensis* areas further inland. However, the present author's

observations of monitors in the field in March and December 2009 suggest otherwise (Weijola & Sweet, 2015). Attempts to locate specimens matching the neotype of *V. indicus* on Ambon and other central Moluccan islands failed despite surveys in all major habitat zones. All 81 individuals observed at a total of nine locations on the islands of Ambon (Liang, Hitu, Soya di Atas and Teluk Ambon: 31 observations), Seram (Desa Besi: 9 obs.), Buru (Namlea, Samleko and Wamlana: 21 obs.), and Saparua (Kulur village: 20 obs.) were identified as conforming to *V. cerambonensis*. The vast majority of these observations were made in coastal habitats typical of *V. indicus* s.l., such as mangroves (13.5%), *Nipa* swamps (15%) and littoral forests and beaches (62%). Far fewer observations were made inland in low-elevation coconut plantations (3.5%), lowland forest (1.2%), lowland sago swamps (1%) and hill forest (2.5%). Published dietary studies (Philipp et al., 2007) also show that a large part of the diet of *V. cerambonensis* consists of crustaceans, which suggests that individuals often hunt and forage in mangroves or intertidal areas. Thus *V. cerambonensis* displays an almost complete overlap in use of habitat and prey compared to that of supposed *V. indicus* in New Guinea (Philipp, 1999), and the presence of two so closely related and ecologically almost identical species on Ambon is unlikely.

9. The findings of these recent investigations (Weijola & Sweet, 2015), viz., that there is only one species of *Varanus* in the central Moluccan region, are also supported by the results of other herpetological field investigations (e.g. Edgar & Lilley, 1993; A. Stubbs, pers. comm., May 2012) as well as by the testimony of several Nuaulu hunters from Teluk Sawai in northern Seram (pers. comm., March 2009).

10. Daudin's (1802) morphological description of *V. indicus* is not detailed enough to be diagnostic, and without the original type specimen the only definite indication of its identity is the asserted type locality, Ambon. As there is no credible evidence that the neotype ZFMK 70650 was collected on Ambon and its morphology disagrees with all other known specimens from Ambon, which field observations and voucher material show to be inhabited by only a single species of this genus, it cannot belong to the species described by Daudin. Instead it seems to belong to *V. chlorostigma* Gray (1831, p. 26), type locality Ravak Island off Waigeo, type specimen MNHN 2202. This name was used for mangrove monitors from 1831–1885 until Boulenger (1885, vol. 2, p. 316) regarded it as synonymous with *V. indicus*. Now, however, as current interpretations of species boundaries recognize the populations on Ambon and Ravak as belonging to separate species (e.g. Philipp et al., 1999), *V. chlorostigma* has again become valid. Under Articles 75.3.5 and 75.3.6 of the Code (not conspecific, and not from close to the type locality), the specimen ZFMK 70650 is not entirely suitable to serve as the neotype of *V. indicus*. To firmly fix the application of the specific name *indicus* to the taxon it originally denoted, to facilitate future taxonomic work on this species group, and to avoid further confusion caused by the current neotype and other type material (such as references to Brazilian *Tupinambis*), a replacement neotype from the type locality is needed. This will have the effect of reducing *V. cerambonensis* to a junior synonym of *V. indicus*, the latter being the valid name of the species from Ambon and other central Moluccan islands (e.g. Seram, Buru, Lease islands).

11. *Varanus indicus* is the name that has been widely applied to mangrove monitors throughout the SW Pacific island region between 1802 and present, with *V. chlorostigma* filling the same purpose between 1831 to 1885. Until the mid-1990s

V. indicus was considered to be a widespread and highly variable species (de Rooij, 1915, p. 149; Mertens, 1942, p. 260; Ziegler et al., 2007a). This situation has seen rapid change over the past two decades as cryptic diversity has been increasingly recognized and several of the allopatric populations have been named as separate species (e.g. Böhme & Ziegler, 1997; Böhme et al., 2002; Ziegler et al., 2007b; Koch et al., 2009; Weijola & Sweet, 2010). The taxonomic resolution will inevitably increase further as more voucher material is collected and analysed with new phylogenetic methods, and the old interpretation of *V. indicus* as a widespread tramp species continues to change. Although the name *V. indicus* has been extensively cited in the literature, many of these references will inevitably become outdated as the taxonomy is revised, regardless of whether the the name is applied in the sense of Daudin (1802), or Philipp et al. (1999). The more recent name *Varanus cerambonensis* has been less used in the literature. *Varanus chlorostigma* has not been in wide use in recent times as it was synonymized with *indicus* more than a century ago (a list of 13 additional references to *indicus* and two additional references to *cerambonensis* has been supplied separately to the ICZN Secretariat in London).

12. A suitable replacement neotype specimen for *Tupinambis indicus* is RMNH 40846 (Naturalis) (Figs. 1–3). This specimen satisfies the required qualifying conditions under Article 75.3:

- (1) It will be designated with the sole intentions of clarifying the taxonomic identity and type locality of *V. indicus*.
- (2) It is consistent with other topotypical material which is defined by having yellow markings on the dorsum arranged in a pattern of transverse bands, the presence of a yellow postocular stripe and a bi-coloured tongue.
- (3) The specimen has the following collection data: ‘Ambon, Indonesia, collected by F. Kopstein, May 1922’.
- (4) The original type specimens have been lost (as detailed in paragraphs 2 and 3), and the neotype designated by Philipp et al. (1999) belongs to a different taxon and does not originate from the type locality (as detailed in paragraph 10).
- (5) *Varanus indicus* is identified as the only known member of its genus existing on the island of Ambon and therefore the proposed neotype can be identified as consistent with the original type material.
- (6) The proposed neotype was collected at the type locality Ambon.
- (7) The proposed neotype is the property of the Naturalis Biodiversity Center Museum in Leiden, The Netherlands.

13. The International Commission on Zoological Nomenclature is accordingly asked:

- (1) to use its plenary power to set aside all previous type fixations for the species-group taxon *Tupinambis indicus* Daudin, 1802 and designate specimen RMNH 40846 as the neotype;
- (2) to place on the Official List of Specific Names in Zoology the following names:
 - (a) *indicus* Daudin, 1802, as proposed in the binomen *Tupinambis indicus*, as defined by the neotype designated in (1) above;
 - (b) *chlorostigma* Gray, 1831, as proposed in the binomen *Monitor chlorostigma*.

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